

muse®

Hacked!

Technology brings with it new opportunities and new risks. Find out how scientists are working to protect your identity and secure networks of information.

CONVERSATION QUESTION

How do advancements in technology test human ethics?

TEACHING OBJECTIVES

- Students will learn how hackers work to strengthen security defense
- Students will learn how biometrics is being used for identity recognition
- Students will learn how bitcoin works
- Students will identify system strengths and vulnerabilities
- Students will identify patterns and models
- Students will engage in argument from evidence
- Students will write informative text
- Students will apply information to different contexts
- Students will write an opinion piece using reasons and evidence



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Be a Hacker**
Expository Nonfiction, ~1050L
- **I Like the Way You Move**
Expository Nonfiction, ~950L
- **Bitcoin**
Expository Nonfiction, ~950L

Be a Hacker

pp. 18–23, Expository Nonfiction

This article describes the need for hackers to help understand vulnerabilities that put information at risk. Use this article to help students understand how systems work.



RESOURCES

- Hacking a Career!

OBJECTIVES

- Students will learn how hackers work to strengthen security defense
- Students will identify system strengths and vulnerabilities
- Students will write informative text

KEY VOCABULARY

- **hacker** (p. 18) a person who secretly gets access to a computer system to get information
- **ethics** (p. 19) rules of behavior based on ideas about what is morally good and bad
- **defenses** (p. 20) things done for protection
- **encryption** (p. 20) changing (information) from one form to another, especially to hide its meaning
- **vulnerability** (p. 21) openness to attack, harm, or damage

ENGAGE

Conversation Question: How do advancements in technology test human ethics?

Ask students to describe a “hacker.” Explain that this article will show that hackers actually have important skills that companies and organizations look for in many of their hires. Have students pay attention to see how ethics is the important distinction when discussing those in the business of hacking.

INTRODUCE VOCABULARY

Display the vocabulary words and ask students how these words might relate to one another. Have students look up the words they are unsure of and write sentences that use two or more words in a sentence.

READ & DISCUSS

Have students read the article and then lead a class discussion based on the following prompts.

- Why are some hackers considered “good” and others “bad”?
- What does a hacker need to know?
- Why are the skills needed for white-hat and black-hat hackers the same?
- Is being a hacker a worthwhile career? Explain.

CONCEPT/SKILL FOCUS: Systems

INSTRUCT: Explain that this article explores how hacking has become a necessity to better understand how systems can be put at risk when criminals want to access personal data and information. Discuss how large networks present bigger challenges and result in the need for constant updates of network defenses.

ASSESS: Take notes during the discussion to assess if students are able to identify the risks and vulnerability networks face from those with criminal intent.

EXTEND

Language Arts: Hack a Career Have students look for career information in the article and record it on the *Hacking a Career!* graphic organizer. Next, have students choose one of the jobs and explain what would be interesting about this work, what a day might be like working on this job, and how ethics would be an important part of the work.

Hacking a Career!

Use this chart to organize information about the different jobs that require hacking skills.

Page	Job	Description
19	White-hat hacker	Works for a company or the government to secure networks and computers against attacks
21	Vulnerability researcher	
22	Red Team	
23	Incident Handlers	

Choose one of the jobs and explain what would be interesting about this work.

I Like the Way You Move

pp. 32–35, Expository Nonfiction

Use this article that describes biometrics of gait, to help students see the importance of studying patterns and models in science.



RESOURCES

- Using Patterns and Models

OBJECTIVES

- Students will learn how biometrics is being used for identity recognition
- Students will identify patterns and models
- Students will apply information to different contexts

KEY VOCABULARY

- **biometrics (p. 33)** the measurement and statistical analysis of people’s unique physical and behavioral characteristics
- **gait (p. 33)** a particular way of walking
- **verify (p. 33)** to prove, show, find out, or state that (something) is true or correct
- **accelerometer (p. 34)** a device that measures acceleration
- **pedometers (p. 34)** an instrument for estimating the distance traveled on foot by recording the number of steps taken

ENGAGE

Conversation Question: How do advancements in technology test human ethics?

Ask students to describe traits that make them unique. Ask them to consider which traits might be measured and used to recognize their identities. Explain that the measuring of these characteristics is called biometrics, and is important to scientists as they attempt to find new ways to keep computer information secure.

INTRODUCE VOCABULARY

Write “biometrics” at the top of a screen or board. Explain to students that their job is to show how the rest of the vocabulary words are connected to the theme of biometrics. Have them work with a partner to draw/write the connections and share in a small group.

READ & DISCUSS

Have students read the article and then lead a class discussion based on the following prompts.

- What is the connection between biometrics and cyber security?
- Ask students to describe their own gait and how it might be different from another person’s.
- What different types of gait movements can be measured?
- What ways could gait be used for security?

CONCEPT/SKILL FOCUS: Identifying Patterns

INSTRUCT: Explain that this article explains how data are collected and used to analyze patterns and make models. Ask students to look for details in the article that support the use of patterns and models to help identify how people move in unique ways. Have students fill in the *Using Patterns and Models* graphic organizer to help record information that supports the use of these crosscutting concepts.

ASSESS: Review the graphic organizer to assess if students are able to identify and differentiate patterns and models associated with the application of biometrics.

EXTEND

Social Studies: Apply Information Have students discuss how humans use their bodies differently depending on their careers. Ask them to describe how a person who works on a ship might walk compared to someone who works in the fields, in a mine, in construction, as a flight attendant, or at a desk. Explain that the muscles used in a career influence how people carry themselves.

Using Patterns and Models

Use this chart to organize information you find about how scientists determine patterns and create models when studying biometric data.

Page	Supporting Details
34	Motion capture technology is used to collect data for models.

Bitcoin

pp. 42–45, Expository Nonfiction

Use this article about bitcoin, to practice engaging in argument from evidence.



RESOURCES

- Bitcoin Pros and Cons

OBJECTIVES

- Students will learn how bitcoin works
- Students will engage in argument from evidence
- Students will write an opinion piece using reasons and evidence

KEY VOCABULARY

- **currency (p. 43)** the money that a country uses: a specific kind of money
- **blockchain (p. 43)** a digital ledger in which transactions made in bitcoin or another cryptocurrency are recorded
- **transactions (p. 43)** when goods, services, or money are passed from one person, account, etc., to another
- **anonymous (p. 44)** not named or identified
- **ransomware (p. 45)** a type of malicious software designed to block access to a computer system until a sum of money is paid

ENGAGE

Conversation Question: How do advancements in technology test human ethics?

Ask students to share what they know about bitcoin before reading the article. Record their ideas and ask them how bitcoin is different from other currency. Refer to the conversation question and discuss how bitcoin relates to human ethics before and after reading the article.

INTRODUCE VOCABULARY

Review the vocabulary words. Ask students which words they think have most recently been added to the dictionary. Explain how words evolve with new technology. Next, have students look for each word in the article and read the sentences for context clues. Review each word's meaning as it relates to bitcoin.

READ & DISCUSS

Have students read the article and then lead a class discussion based on the following prompts.

- How is bitcoin different from other currency?
- Why might people prefer to use bitcoin?
- Is bitcoin more or less likely to attract criminals?
- What ways are people safeguarding their bitcoin?

CONCEPT/SKILL FOCUS: Engaging in Argument

INSTRUCT: Explain that this article describes the different issues related to using virtual currency known as bitcoin. Direct students to carefully read the article to collect evidence that demonstrates the pros and cons of using bitcoin and record this on the *Bitcoin Pros and Cons* graphic organizer.

ASSESS: Review the graphic organizer to assess if students are able to identify details that support both the pros and cons of using bitcoin.

EXTEND

Language Arts: Pros and Cons Have students write an opinion piece either for or against the use of bitcoin. Have them refer to the *Bitcoin Pros and Cons* graphic organizer to use examples from the article to support their points.

Bitcoin Pros and Cons

Use this chart to organize information you find about the pros and cons of using bitcoin.

Page	Pro	Con
43		Lack of laws controlling it